

What is Claimed is:

1. A honeycomb structure comprising:

a plurality of through channels extending to an axial direction of a honeycomb structure, porous partition walls separating through channels one another, and plugging portions; said plugging portion plugging predetermined through channels at one end and the rest of through channels at other end opposite to the plugged end of the predetermined through channels,

10 wherein at least a part of predetermined crossing portions of the porous partition walls is discontinued to form a void portion in each of the predetermined crossing portions.

15 2. The honeycomb structure according to claim 1, wherein the void portions are formed along a whole length of the honeycomb structure at predetermined positions at a regular interval.

20 3. The honeycomb structure according to claim 1, wherein a gap width of the void portion is in a range of 0.2 to 1 mm.

25 4. The honeycomb structure according to claim 1, wherein a gap width of the void portion is in a range of 0.4 to 0.8 mm.

5. The honeycomb structure according to claim 1,  
wherein a gap width of the void portion at the vicinity of an  
outer peripheral portion of the honeycomb structure is larger  
than that of the void portion in a central portion seen from  
5 one of end faces of the honeycomb structure.

6. The honeycomb structure according to claim 1,  
wherein a thickness of the partition wall having no void  
portion and extending without having discontinued portion in  
10 a predetermined direction is larger than that of the  
partition wall having the void portion and a discontinued  
portion defined by the void portion in a section of the  
honeycomb structure crossing at right angles to a length  
direction.

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7. The honeycomb structure according to claim 6,  
wherein the thickness of the partition wall having no void  
portion and extending without having a discontinued portion  
in the predetermined direction is 1.05 to 1.5 times that of  
20 the partition wall having the void portion and the  
discontinued portion defined by the void portion in the  
section of the honeycomb structure crossing at right angles  
to the length direction.

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8. The honeycomb structure according to claim 6,  
wherein the thickness of the partition wall having no void  
portion and extending without having a discontinued portion

in the predetermined direction is 1.1 to 1.3 times that of  
the partition wall having the void portion and a discontinued  
portion defined by the void portion in the section of the  
honeycomb structure crossing at right angles to the length  
5 direction.

9. The honeycomb structure according to claim 1,  
wherein a sectional shape of the through channel is any one  
of a triangular shape, a quadrangular shape, a hexagonal  
10 shape, and a circular shape.

10. The honeycomb structure according to claim 1,  
wherein a sectional shape of the through channel is a  
quadrangular shape, the void portion is regularly formed at  
15 every other crossing portion of partition walls disposed  
adjacent to one another, and only one gap is formed by the  
void portion in each of predetermined through channels.

11. The honeycomb structure according to claim 1 is  
20 used as a filter for trapping/collecting/ removing  
particulate materials included in dust-containing fluids such  
as an exhaust gas of an internal combustion engine by virtue  
of a filterability of the partition walls.

25 12. The honeycomb structure according to claim 1,  
wherein the honeycomb structure is made of a material, as a  
major crystal phase, containing any one selected from the

group consisting of cordierite, silicon carbide, silicon nitride, alumina, mullite, and LAS.

13. A method for manufacturing a honeycomb  
5 structure containing a plurality of through channels  
extending to an axial direction of a honeycomb structure,  
porous partition walls separating through channels one  
another, and plugging portions; said plugging portion  
plugging predetermined through channels at one end and the  
10 rest of through channels at other end opposite to the plugged  
end of the predetermined through channels, wherein at least a  
part of predetermined crossing portions of the porous  
partition walls is discontinued to form a void portion in  
each of the predetermined crossing portions, which comprising  
15 the steps of:

preparing a die for extruding a honeycomb structure  
having slits for forming void portions in an intended manner  
when a honeycomb structure is extruded, and

extruding a honeycomb structure having a plural  
20 number of void portions in at least a part of the  
predetermined crossing portions of partition walls.

14. An exhaust gas purification system for  
trapping/collecting/removing particulate materials containing  
25 carbon as a major component included in dust-containing  
fluids such as an exhaust gas of an internal combustion  
engine, the system comprising:

a honeycomb structure containing a plurality of through channels extending to an axial direction of a honeycomb structure, porous partition walls separating through channels one another, and plugging portions; said 5 plugging portion plugging predetermined through channels at one end and the rest of through channels at other end opposite to the plugged end of the predetermined through channels, wherein at least a part of predetermined crossing portions of the porous partition walls is discontinued to 10 form a void portion in each of the predetermined crossing portions; and

heating means for burning the particulate materials trapped/collected by the honeycomb structure to regenerate a filtering capacity thereof,

15 wherein the void portion of the honeycomb structure has such a construction that the void portion is closed due to accumulated trapped/collected particulate materials during actual run, thus closed void portion is reopened by burning particulate materials accumulated by heating for the 20 regeneration thereof, and at least some of unburnt materials such as ashes deposited in the honeycomb structure is discharged from the honeycomb structure together with a flow of dust-containing fluids, when the void portion is reopened.

25 15. The exhaust gas purification system according to claim 14, wherein the heating means is any one of an electric heater, a burner using a gas or liquid fuel, a

microwave generation apparatus, and heating means for  
discharging unburnt fuel components in the exhaust gas of the  
internal combustion engine and for burning the unburnt fuel  
components by a catalytic reaction to raise an exhaust gas  
5 temperature.